PREPARING FOR THE MINNESOTA RESIDENTIAL CASE STUDY EXAM

MAAO
Minnesota Association of Assessing Officers

Minnesota Association of Assessing Officers
Minnesota State Board of Assessors

2019

Overview

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Minnesota Association of Assessing Officers

MINNESOTA RESIDENTIAL CASE STUDY EXAM

The purpose of the exam is to provide a method to achieve the designation level of Accredited Minnesota Assessor (AMA). This exam, along with a residential form report, is an alternative to writing a narrative appraisal report on a single-family residential property.

The minimum requirements to take the exam are:

- ✓ Currently hold the designation of Certified Minnesota Assessor
- ✓ Be currently licensed with the State Board of Assessors

While not a requirement, it is strongly suggested that the candidate complete a passing demonstration form report before taking the case study exam.

"*Appraising Residential Properties*" from the Appraisal Institute and the Case Study Exam Workshop materials will provide an excellent review.

The exam is in two parts. Part 1 is in three sections; Section 1 is comprised of 35 multiple choice questions with an emphasis on appraisal principles and procedures. Section 2 has 15 short answer questions, which also are based on appraisal principles and procedures. Section 3 has 10 problem-solving questions which address procedures in the Cost Approach, Sales Comparison Approach, and deriving various types of depreciation.

Part 2 of the exam is in a narrative format. The candidate is provided detailed market, income and cost data to arrive at a value for a single-family residential property using the three approaches to value. A sales ratio analysis follows the three approaches and includes a statistical formula sheet for your use. The importance of this part is to DEMONSTRATE the candidate's knowledge of the appraisal process and to be able to extract data from the market information.

To successfully complete the exam a combined score of 90, or 75% of the maximum 120 points is required. The candidate has two opportunities to successfully complete the exam. If the second attempt is not successful, the candidate is required to write a demonstration narrative appraisal on a single-family residential property.

Minnesota Association of Assessing Officers
PO Box 41576, Plymouth, MN 55441

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MINNESOTA RESIDENTIAL CASE STUDY EXAM
GRADING SUMMARY

Candidate's Name:	Date:
Candidate's Address:	License #:
Exam Date:	Grader:
Proctor:	

1st Grading ☐ 2nd Grading ☐

		Possible Points	Points Received
PART 1	Section 1 – Multiple Choice	35	
	Section 2 – Short Answer	15	
	Section 3 – Problem-Solving	10	
	Total Points Part 1	60	

		Possible Points	Points Received
PART 2	- Cost Approach	20	
	- Income Approach	15	
	- Sales Comparison Approach	20	
	- Reconciliation	5	
	Total Points	60	
	TOTAL POINTS - 2 PARTS	**120**	

Minimum passing score is 90 points or 75%.

Pass ☐ Fail ☐

Grader's Signature Date

Attached are the grading sheets.

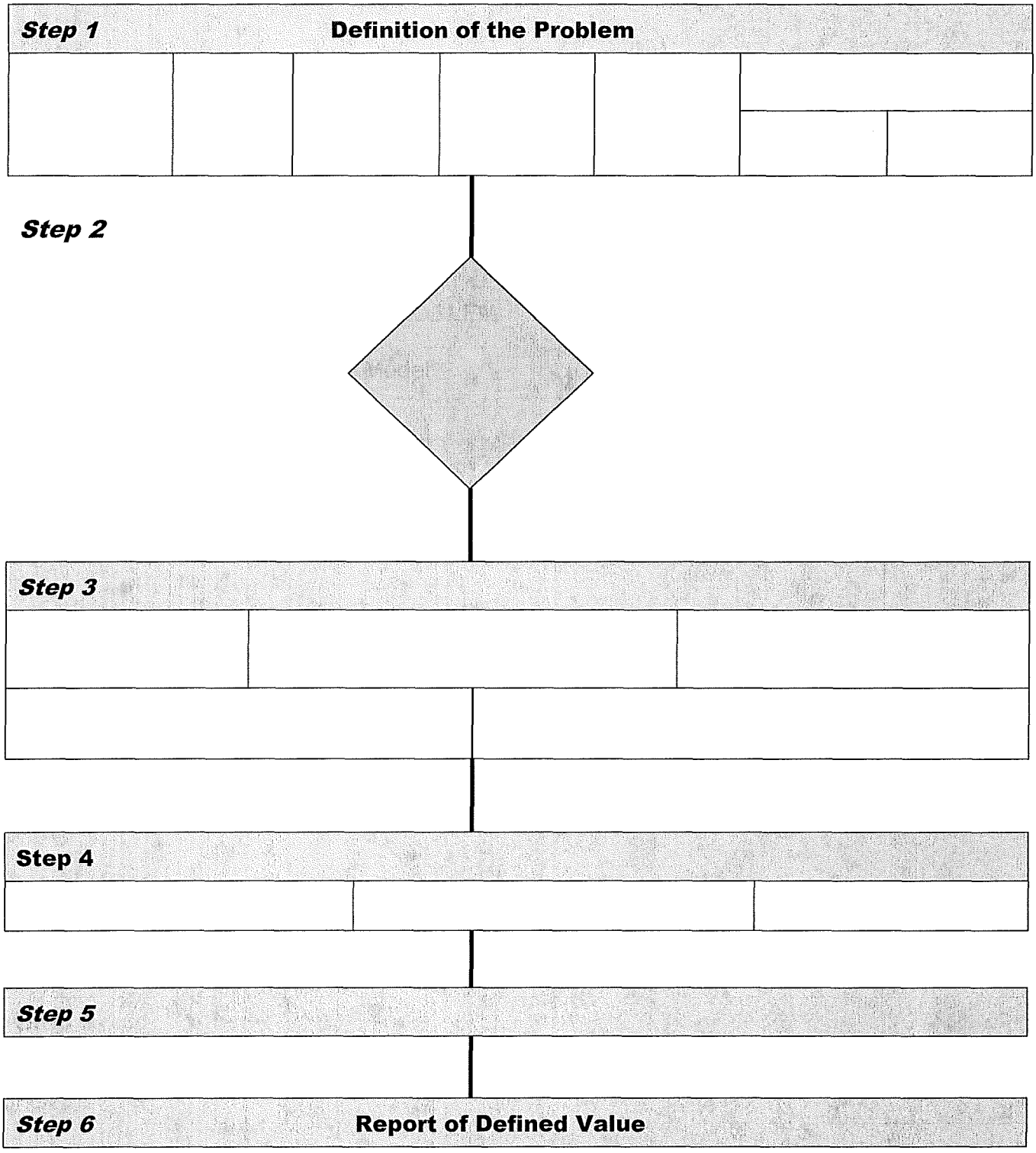
Terminology & Methodologies to Review from "Appraising Residential Properties," 4th Edition

Part 1 - Problems

Preparing for the Minnesota Residential Case Study Exam

APPRAISAL PROCESS MODEL PROBLEM

Complete the Appraisal Process Model



TERMINOLOGY QUIZ

Match the following terms

_____ 1. Anticipation

_____ 2. Balance

_____ 3. Change

_____ 4. Competition

_____ 5. Conformity

_____ 6. Consistent Use

_____ 7. Contribution

_____ 8. Demand

_____ 9. Direct Costs

_____ 10. Eminent Domain

_____ 11. Entrepreneurial Profit

_____ 12. Escheat

_____ 13. Externalities

_____ 14. Indirect Costs

_____ 15. Supply

_____16. Substitution

_____17. Substructure

_____18. Superstructure

A. The basis for applying the adjustments in the sales comparison approach.

B. States that a property must be valued with a single use for the entire property.

C. The amount of product that producers are willing to sell under various conditions during a given time.

D. A market derived figure that represents the amount a developer expects to receive for his or her contribution to a project including risk.

E. Expenditures for the labor and material used in the construction of improvements.

F. The portion of a building that is above grade.

G. Maximum value is obtained when the four agents of production attain a state of equilibrium.

H. Quantities of various goods that people are willing and able to buy during some period, given the choices available to them.

I. The tendency of social and economic forces affecting supply and demand to alter over time.

J. Availability must be in harmony with demand.

K. The value of property depends in part, in its relationship to its surroundings.

L. A building's entire foundational structure, which is below grade.

M. Expenditures for items other than labor and material.

N. Market value of a property tends to be set by the cost of acquiring an equally desirable and valuable property.

O. Factors external to a property can have either positive or negative effects on its value.

P. Present worth of future benefits associated with ownership of property.

Q. Taking of private property for public use.

R. Transfers the property of a person who dies without heirs to the state.

DEFINITIONS

In your own words, briefly define the following terms:

1. Real Estate

2. Real Property

3. Market Value

4. Cost

5. Price

6. Replacement Cost

7. Reproduction cost

REAL ESTATE BASICS

List the four forces affecting Real Estate and provide an example of each.

1.

2.

3.

4.

List the four tests of highest and best use.

1.

2.

3.

4.

THREE APPROACHES TO VALUE

List the steps in the three approaches to value:

Cost

Income

Sales Comparison

UNITS & ELEMENTS OF COMPARISON

List possible units of comparison for:

Vacant Residential Sites	Improved Residential Properties

List possible elements of comparison for:

Vacant Residential Sites	Improved Residential Properties

COST APPROACH SITE VALUATION PROBLEM

To estimate the value of the site, you have discovered the following site sales in the vicinity. Although they are different sizes, they are all zoned the same as the subject property and have public utilities available. The following is a summary of the site sales you will be using to value the subject site.

Sale #	Subject	1	2	3	4
Sale Date		10/05/2014	03/15/2014	01/31/2014	12/01/2014
Sale Price		$55,000	$50,000	$45,000	$60,000
Site Size	14,000	15,000 Sq. Ft.	12,000 Sq. Ft.	13,000 Sq. Ft.	15,000 Sq. Ft.
Front Feet	100	100	90	100	90

- Sale #3 is 5% inferior to subject
- Sale #4 is 5% superior to subject
- Date of Appraisal is March 1, 2015

Analyze the following subject neighborhood sales to estimate a market conditions adjustment and complete the site valuation grid on the following page.

Site Sale #1 Date: July 2012 Sale Price: $33,000
Date: December 2014 Sale Price: $37,800

Indicated market conditions adjustment _____ per month

Indicated market conditions adjustment _____ annually

Site Sale #2 Date: August 2013 Sale Price: $40,000
Date: November 2014 Sale Price: $43,000

Indicated market conditions adjustment _____ per month

Indicated market conditions adjustment _____ annually

Indicated market conditions adjustment for subject site _____ per month and

_____ annually.

COST APPROACH SITE VALUATION WORKSHEET

1. Based on the site sales provided on page 7, complete the following data/adjustment grid to list and analyze both the units of comparison and elements of comparison. *This grid may or may not reflect the number of required adjustments.*

	Subject	Sale #1	Sale #2	Sale #3	Sale #4	% Difference
Sale Price		$55,000	$50,000	$45,000	$60,000	
Sale Date	03/2015	10/2014	03/2014	01/2014	12/2014	
Sq. Ft.	14,000	15,000	12,000	13,000	15,000	
Front Ft.	100	100	90	100	90	
Mkt. Cond. Adj.						
Mkt. Cond. Adjusted Sale Price						
Adj. Sale Price/Site						
Adj. Sale Price/Sq. Ft.						
Adj. Sale Price/Front Ft.						
Adjustment						
Adjusted Sale Price						
Adjusted Sale Price per_____						
# Adjustments						
Gross Adjustments						
Net Adjustments						

2. Estimate the site value of the subject based on the units of comparison and elements of comparison.

RESIDENTIAL SITE VALUATION: ALLOCATION METHOD

Residential Site Valuation:

1. Sale #1 sold for $220,000, and Sale #2 sold for $275,000. There are no comparable site sales in the area, but a recent study for this neighborhood shows sites typically represent 26% of total property value for homes under $250,000 and 18% of total property value for homes over $250,000. What is the site value indicated for Sale #2?

2. A certain single-family residential property sold for $250,000. Your analysis shows that the ratio of land-to-improvement is 1:4. What is the indicated site value?

RCN PROBLEMS

1. A house contains 3,100 square feet of building area. There is an attached garage measuring 42 by 24 feet. The square foot reproduction cost is estimated at $95.00 for the building area and $25.00 for the garage. The total replacement cost new of the entire structure is _____.
   a. $294,500
   b. $319,700
   c. $102,700
   d. $390,300

2. The most detailed method of estimating the cost new of a structure is the
   a. Quantity survey method
   b. Unit-in-place method
   c. Trade breakdown or builder's method
   d. Segregated cost method

3. The unit-in-place cost-estimating method is
   a. Based on historical cost
   b. Based on the market-extracted costs per square foot of the building
   c. Based on the cost of each component of the building, including all labor and materials
   d. Based on a computerized printout of all labor, materials, and extras

4. A cost-estimating method in which appraisers estimate the current cost of construction based on the amount paid for the building when it was built is called
   a. Cost index trending
   b. Segregated cost
   c. Cost engineered services
   d. Unit-in-place method

5. When appraising an improved property with substantial functional losses, you should
   a. Be conservative in the cost new estimate to accommodate those losses
   b. Accurately estimate the cost and deal with the obsolescence in the depreciation estimate
   c. Not apply the cost approach because it is too hard
   d. Apply the cost approach because it is the only method you have that will give an accurate value

6. The subject improvement is a 2,855 square-foot, two-story residence with a 1,200 square foot basement with 900 square foot (minimal) finishing in the basement. The basement floor is 8 inch concrete, and the basement area is all subterranean (not walkout). There is 726 square feet, three-car attached garage, a 466 square foot glass-enclosed porch with a wood ceiling and wood walls. There is wood siding and an asphalt shingle roof. The house has 10 rooms, four bedrooms, 2-1/2 baths, one masonry fireplace, and trim and finish commensurate with the market. It has typical kitchen and bath finishes. The floor coverings are 90% carpeted and 10% ceramic. The built-in kitchen appliances include a range/oven, dishwasher, disposal unit, and microwave. There is a gas forced-air furnace and central air-conditioning.

Worksheet for Cost-Estimating Problem

House	2,855 sq. ft. @	_____	=	_____
Roof	1,425 sq. ft. @	_____	=	_____
Fireplace		_____	=	_____
Carpet	90% of 2,855 sq.ft.	_____		_____
Tile	10% of 2,855 sq. ft.	_____		_____
Appliances		_____	=	_____
Central A/C	2.855 sq. ft. @	_____	=	_____
Basement	1,200 sq. ft. @	_____	=	_____
Basement finish	900 sq. ft. @	_____	=	_____
Garage	726 sq. ft. @	_____	=	_____
Enclosed porch	466 sq. ft. @	_____	=	_____
Porch ceiling	466 sq. ft. @	_____	=	_____
Subtotal		_____		_____
Multipliers		_____	=	_____
Total		_____		_____

Using the cost manual from the following page, calculate the RCN:

Two-Story Above Grade Residence Cost per Square Foot of Area (Frame Residence)						
Area	Stucco or Siding	Shingle or Shake	Rustic Log	Brick Veneer	Stone Veneer	Synthetic (EFIS)
2,000 sq. ft.	72.65	72.68	88.96	78.33	86.39	74.77
2,200 sq. ft.	70.96	70.99	86.80	76.44	84.20	73.01
2,400 sq. ft.	69.46	69.49	84.88	74.75	82.24	71.44
2,600 sq. ft.	68.10	68.13	83.14	73.23	80.48	70.02
2,700 sq. ft.	67.47	67.50	82.34	72.53	79.67	69.36
2,800 sq. ft.	66.87	66.90	81.57	71.86	78.89	68.73
2,900 sq. ft.	66.30	66.32	80.84	71.21	78.15	68.13
3,000 sq. ft.	65.75	65.77	80.13	70.59	77.43	67.55
3,100 sq. ft.	65.22	65.24	79.46	70.00	76.75	67.00
3,200 sq. ft.	64.71	64.73	78.81	69.44	76.10	66.47
3,300 sq. ft.	64.22	64.25	78.19	68.89	75.47	65.96

Refinements	Add for
Wood shakes	Included in base
Asphalt shingles	(-) $.78
Wood shingles	(-) $.12
Clay or slate	(+) $3.40 per sq. ft.
Floor covering	(+) $4.92 for carpet/pad
	(+) $12.21 per sq. ft. for hard wood
	(+) $13 per sq. ft. for ceramic
	(-) $5 per sq. ft. for vinyl
Plaster walls	(+) $1.50 per sq. ft.
HVAC	Forced-air system in base cost
Central A/C	(+) $1.70 per sq. ft.
Heat pump	(+) $2.18 per sq. ft.
Energy efficiency	Mild climate (-) $1.00
	Severe climate (+) $1.00

Add ons	
Fireplace - one-story	$3,900-4,800
Fireplace - two-story	$4,700-6,000
Fireplace - flueless	$2,100-3,000
Appliances	
Garbage disposal	$389
Oven/microwave	$1,800
Refrigerator	$2,100
Trash compactor	$325
Central vacuum	$1,900
Dishwasher	$850

Basement Area	400 sq. ft.	800 sq. ft.	1,200 sq. ft.	1,600 sq. ft.	2,000 sq. ft.
Unfinished 8-in. poured concrete	$24.00	$19.00	$17.65	$14.78	$12.55
Unfinished 12-in. poured concrete	27.25	21.60	18.15	16.95	16.55
Minimal finishing	8.88	7.59	7.05	6.85	6.50
Extensive finishing	32.05	31.50	29.88	29.01	28.55

Garage Area		400 sq. ft.	600 sq. ft.	800 sq. ft.	1,000 sq. ft.
Attached garage	Stucco	$29.50	$27.38	$26.00	$24.67
	Wood siding	29.38	26.68	24.98	23.82
	Masonry	31.99	28.47	26.55	25.18
	Add for interior finish	5.23	4.64	4.41	4.03

Porch Area	100 sq. ft.	200 sq. ft.	300 sq. ft.	400 sq. ft.	500 sq. ft.
Slab - open	$5.05	$4.58	$4.23	$4.05	$3.95
Wood deck	18.08	14.64	11.16	10.85	10.25
Screened porch	13.00	12.50	11.00	10.50	10.01
Enclosed w/wood and glass	41.55	31.58	31.22	29.68	28.55
Enclosed w/masonry and glass	45.85	37.85	34.55	33.00	31.08
Add for ceiling	5.00	4.58	4.25	4.15	4.01

Current cost multiplier = 1.08
Local cost multiplier = 1.03

ECONOMIC LIFE ESTIMATION PROBLEM

	Sale #1	Sale #2	Sale #3
Sale Price	$225,000	$230,000	$210,000
Site Value	(125,000)	(125,000)	(125,000)
Improvement Value	$100,000	$105,000	$ 85,000
RCN (Improvements)	$141,760	$141.920	$120,720
Indicated Value of Improvements	(100,000)	(105,000)	(85,000)
Accrued Depreciation	$	$	$
Percent Depreciation	%	%	%
Indicated Effective Age	30	28	30
Percent Annual Depreciation			
Estimated Total Economic Life (Years)			

ECONOMIC LIFE ESTIMATES AND DEPRECIATION
Problem #1

A house with a current RCN of $150,000 was built 25 years ago is in good condition. Based on your inspection, you estimate the effective age to be 20 years and a remaining life of 60 years.

What is the chronological age of the structure?

What is the effective age of the structure?

What is the total economic life estimate of the structure?

What is the remaining economic life of the structure?

Calculate the accrued depreciation of the structure on lump sum and percentage basis.

Problem #2

Market Conditions Adjustment Calculations

Property #1		Property #2	
1st Sale - June 2011	$150,000	1st Sale - October 2012	$160,000
2nd Sale - August 2014	$175,000	2nd Sale - April 2015	$180,000

Calculate the market conditions adjustment.

- Annual
- Monthly

DEPRECIATION EXAMPLES

Provide an example of the following forms of depreciation:

1. Physical curable

2. Physical Incurable

3. Functional Curable

4. Functional Incurable

5. External Obsolescence

DEPRECIATION PROBLEMS

1. The following information on incurable short-lived building components is provided.

	Current Reproduction Cost	**Actual Age**	*Total Physical Life*
Roof Cover	$6,000	10 years	30 years
Floor Cover	$12,000	5 years	12 years
Painting	$5,000	5 years	10 years

Calculate the incurable physical deterioration in the short-lived components.

2. A residential duplex is to be converted into a single-family unit. It presently has two furnaces and each is capable of servicing the entire building. The following data are provided.

Reproduction cost of one furnace	$6,000
Physical deterioration charged to date	$1,000
Cost to remove one furnace and refinish space	$ 500

Calculate the curable functional obsolescence caused by the superadequacy.

3. The kitchen in a single-family residence has kitchen cabinets that are not acceptable in the current market. The following information is provided.

Cost of new cabinets, installed	$15,000
Reproduction cost of existing cabinets (installed during construction)	$10,000
Accrued depreciation in existing cabinets	$ 8,000

Calculate the curable functional obsolescence caused by this deficiency requiring substitution or modernization.

4. The building being appraised has a current reproduction cost of $200,000, an effective age of 14 years, and a total economic life of 80 years.

Calculate the accrued depreciation and improvement value of this building using the economic age-life method.

5. The following data are provided.

	Sale 1	Sale 2	Sale 3
Sale price	$199,000	$235,000	$164,000
Land value	$60,000	$70,000	$50,000
Current reproduction cost	$250,000	$315,000	$210,000

Calculate the depreciation for each sale as a percentage of the current reproduction cost of the improvements.

6. A comparable property was sold for $250,000. Market analysis reveals that the following adjustments are appropriate.

Market conditions	plus 15%
Location	minus 5%
Conditions of sale	minus 10%
Physical characteristics	plus 15%
Financing	minus 5%

Make these adjustments to the comparable's sale price to develop an adjusted indication of value for the subject property. Consider the order of adjustments as well as their amounts.

Problem 7

The following data have been calculated for use in the cost approach.

Current reproduction cost	
Building improvements	$175,000
Site improvements	$ 15,000
Physical deterioration	
Curable	$ 5,000
Incurable – long-lived	$ 25,000
Incurable – short-lived	$ 5,000
Functional obsolescence	
Curable	$ 5,000
Incurable	$ 0
External obsolescence	$ 7,000
Depreciation of site improvements	$ 5,000
Site value	$ 60,000

Calculate the indicated value of the fee simple interest in the subject property using the cost approach.

The following table presents information on six sales that an appraiser considers comparable to the single-family residence being appraised.

	Subject	Sale 1	Sale 2	Sale 3	Sale 4	Sale 5	Sale 6
Price		$175,000	$174,000	$170,000	$180,000	$182,000	$179,000
Date	Current	Current	1 year old	Current	1 year old	Current	Current
Size	2,000 sq.ft.	2,000 sq.ft.	2,000 sq.ft.	1,500 sq.ft.	2,000 sq.ft.	2,000 sq.ft.	1,500 sq.ft.
Location		Similar	Similar	Similar	Superior	Similar	Superior
Age	5 years	5 years	5 years	5 years	5 years	New	5 years
Basement	Yes	No	No	No	No	Yes	Yes

8. Calculate appropriate adjustments for the variables listed.

9. Create a market data grid for the comparison and adjustment of data.

	Sale 1	Sale 2	Sale 3	Sale 4	Sale 5	Sale 6
Price						
Market Conditions						
Size						
Location						
Age						
Basement						
Indicated value of subject						

10. Derive a value indication for the subject property.

DEPRECIATION MULTIPLE CHOICE PROBLEMS

1. An incurable functional problem is best defined as:
   a. An item that cannot be physically cured.
   b. An item that will not return as much in value as it costs to fix.
   c. An item that is already cured.
   d. An item that is scheduled to be cured but has not yet been cured.

2. If a window has an effective age of 10 years and a remaining economic life of 25, the percentage of depreciation (rounded) is:
   a. 20%
   b. 30%
   c. 40%
   d. 50%

3. A property has overhead garage doors that are 13 years old. It costs $1,900 to replace. Because the inclement weather comes out of the northwest, these doors typically last 15 years if they face the west and 25 years if they face east. This door faces east. What is the amount of value left in this item?
   a. $253
   b. $912
   c. $988
   d. $1,647

4. Effective age is
   a. Actual age of property with better-than-normal maintenance.
   b. Total economic life minus remaining economic life.
   c. Total utility minus diminished utility.
   d. Total economic life minus actual age.

5. An item of depreciation is curable if
   a. The cost to cure is less than the expected increase in value.
   b. The cost to cure is no greater than the reproduction cost.
   c. The cost to cure is no greater than the replacement cost.
   d. It has any remaining economic life.

6. A property has a poor floor plan because it has only 1-1/2 bathrooms in a market that clearly requires 2 or 2-1/2 bathrooms. This problem could be corrected for about $5,500 by moving some interior walls around. The floor plan problem is fairly common in this market, and there is enough data to show that homes with this problem sell for $160,000 and homes without the problem (i.e., with 2 baths) sell for $170,000. This house is 50 years old. Adding the half bath during construction would cost $1,000. This problem is best identified as:
   a. Physical curable depreciation.
   b. Functional curable obsolescence.
   c. External curable obsolescence.
   d. Functional incurable obsolescence.

Use this data for Questions 7 through 10:

The residence you are appraising is 10 years old. You estimate reproduction cost at $128,700. Your inspection of the property found only one item needing immediate repair. The garage door opener is broken, which would cost $450 to repair. The short-lived items are scheduled as follows:

Item	Age	Life	Cost New	Depreciation
Roof shingles	10	25	$6,500	
Furnace	10	20	$3,500	
Carpets	4	8	$8,500	
Vinyl floor covers	0	8	$5,500	
Kitchen and bathroom finishes	10	30	$15,000	
Exterior doors	10	25	$4,400	
Windows	10	35	$2,900	
Total			$46,300	

This home has only 1-1/2 baths, which is clearly deficient. A number of homes in the subdivision have had the half bath converted to a full bath by removing a closet and installing a shower. This conversion costs about $2,000. Adding this shower during construction would cost $1,000. Comparable sales (with the same bathroom problem) indicate the following depreciation overall:

	Sale 1	Sale 2	Sale 3	Sale 4
Sale Price	$89,000	$99,000	$78,000	$88,000
Estimated site value	$17,000	$19,000	$16,000	$17,000
Calculated building value	$72,000	$80,000	$62,000	$71,000
Estimated reproduction cost	$99,500	$90,000	$80,000	$77,000
Less calculated building value	-$72,000	-$80,000	-$62,000	-$71,000
Calculated depreciation	$27,500	$10,000	$18,000	$6,000
Percentage depreciation	27.64%	11.11%	22.50%	7.79%
Age of improvement	18	7	15	5
Percentage depreciation per year	%	%	%	%

7. Estimate the depreciation for curable physical deterioration.

8. Estimate the depreciation for functional obsolescence.

9. Estimate the depreciation for short-lived items.

10. Estimate the depreciation for long-lived items.

DEPRECIATION CALCULATED FROM THE MARKET

You are developing the cost approach for the appraisal of a single-family residence. You have calculated the replacement cost new and are now in the process of estimating the amount of accrued depreciation. You find two properties that have sold which are similar to the subject and which have a replacement cost that is well documented. You have the following information for each sale.

	Sale 1	**Sale 2**
Sale Price	$245,000	$255,000
Replacement Cost New	$250,000	$260,000
Site Value	$50,000	$50,000

Your market analysis (in the first step of the cost approach) has estimated a site value of $50,000 per site for the subject and the comparable properties. Replacement cost new for the subject property is $255,000.

Using the information above and the following grid, estimate the percent of depreciation applicable to the subject property and the total property value of the subject based on the market based method of estimating depreciation.

DEPRECIATION CALCULATED FROM THE MARKET - WORKSHEET

	Sale 1	Sale 2
Sale Price		
Less Site Value		
Market Value of Improvements		
Replacement Cost New		
Less Market Value of Improvements		
Estimated Depreciation		
Converted to Percentage		
Subject Property		
Replacement Cost New		
Less Depreciation		
Replacement Cost New Less Depreciation		
Plus Site Value		
Total Property Value		

Residential Income Approach Overview

- The **Income Approach** is based on the concept of **anticipation** of future benefits (income).
- **Capitalization** is the process of converting income into value.
- There are different methods of income capitalization. The best method for Residential properties is the **GRM (*Gross Rent Multiplier*)** Method. *(As long as there is enough comparable market data available).*
- **GRM** – The **Factor** resulting from dividing a property's **Sale Price (Value)** by the **Gross Rent (Income)** of the property.
- **VIF** -

$$\frac{\text{VALUE}}{\text{INCOME}} \quad \Big| \quad \text{FACTOR or MULTIPLIER}$$

Three Steps to Income Capitalization with a GRM

1. **Derive a GRM from Market Data** - The appraiser finds recent sales of similar properties that were **rented** at the time of sale.
2. **Estimate the Market Rent for the subject property** – Based on comparable properties that are currently **rented** in the market.
3. **Multiply the Market Rent for the subject by the derived GRM** – The result is the indicated value of the subject.

Elements of Comparison

- Location (Proximity to public transportation, schools, places of worship & neighborhood services.)
- Size
- Quality
- Condition
- Finished Area
- Air Conditioning
- Fireplace
- Garage / On-site Parking
- _____
- _____
- _____
- _____

CALCULATION OF GRM PROBLEM

Comparable Sale	Verified Sale Price	Verified Monthly Rent	Indicated GRM
1	$190,500	$1,800	
2	$199,500	$1,850	
3	$195,000	$1,775	
4	$210,500	$1,950	
5	$200,000	$1,800	
6	$212,500	$1,950	
7	$197,500	$1,810	
8	$225,000	$2,025	
9	$192,500	$1,800	
10	$205,500	$1,850	

Average / Mean	
Median	

Income Approach

	Subject	*Rental #1*	*Rental #2*	*Rental #3*
Square Feet	1,230	1,210	1,250	1,150
# of Rooms	6	5	6	5
# of Bedrooms	3	2	3	2
Monthly Rent		$800	$800	$750

Units of Comparison Analysis

	Rental #1	*Rental #2*	*Rental #3*
Rent / SF	$	$	$
Rent / Room	$	$	$
Rent / Bedroom	$	$	$

Best Unit of Comparison: _____

Range: $_____ to $_____

Market Rent: $_____

GRM Calculation

Sale Price $134,000
Monthly Rent $825

Sale Price $136,000
Monthly Rent $800

Sale Price $135,000
Monthly Rent $800

Indicated GRM: _____

V
I | F

Indicated Value

_____ X _____ = _____
Rent Multiplier Value

UNITS OF COMPARISON - IMPROVED

	Subject	*Sale 1*	*Sale 2*	*Sale 3*	*Sale 4*
Sale Price		$150,000	$142,000	$160,000	$138,000
Square Feet	1,250	1,200	1,050	1,300	1,000
# Rooms	6	6	5	6	5
# Bedrooms	3	3	3	3	3

Use the following grid to determine the best unit of comparison.

	Subject	*Sale 1*	*Sale 2*	*Sale 3*	*Sale 4*
Square Feet					
Price/Sq. Ft.					
# Rooms					
Price/Room					
# Bedrooms					
Price/Bedroom					

Sq. Ft. Range _____ to _____

Room Range _____ to _____

Bedroom Range_____ to _____

PAIRED SALES ANALYSIS

Consider the following sales data:

- All sales took place last month.
- All properties are single-family three-bedroom houses.
- Sales 1, 2, and 3 properties have the same significant attributes including a single-car garage, except that sale 1 has a finished basement and the others do not.
- Sales 4, 5, 6, and 7 have the same significant attributes including a double-car garage, except that sale 4 has a finished basement and the others do not.

What lump-sum dollar amount does a finished basement contribute to the value of a single-family house in the market represented by these properties?

Sale No.	Sale Price
1	$145,600
2	$140,000
3	$140,200
4	$151,600
5	$146,000
6	$146,100
7	$146,200

COMPARATIVE SALES (LUMP-SUM ADJUSTMENTS)

You are to estimate the value of a single-family residence using the sales comparison approach. The subject property has 1,400 square feet, three bedrooms, one bath, an attached double garage, and no fireplace. Heating is forced hot air.

A search reveals that there are four recent sales of single-family residences in the neighborhood similar in age, construction, and amenities to the subject.

Sale 1 is a 1,480 square foot, four-bedroom, two-bath residence with an attached double garage. It has two fireplaces and hot water heat. It sold two years ago for $280,500.

Sale 2 is a 1,420 square foot, three-bedroom, one-bath residence with an attached single-car garage, but no fireplace. Heating is forced hot air. It sold recently for $275,200.

Sale 3 is a 1,380 square foot, three-bedroom, two-bath residence with an attached double garage and a fireplace. It has hot water heat. It sold two years ago for $278,000.

Sale 4 is a 1,520 square foot, four-bedroom, two-bath residence with an attached double garage. It has hot water heat and two fireplaces. The sale price included personal property worth $6,000. It sold one year ago for a total price of $291,500.

For this analysis, assume the following contributions to value (adjustments):

One fireplace	$ 4,000
Two fireplaces	$ 6,000
Single-car garage	$14,000
Double-car garage	$20,000
Forced hot air heat	$ 4,500
Hot water heat	$ 5,600
Fourth bedroom	$12,000
Extra bath	$ 5,000

Sales indicate that prices have increased 5 percent per year for the last five years.

Prepare a lump-sum adjustment chart and estimate the value of the subject property.

COMPARATIVE SALES WORKSHEET

	Subject	Sale 1	Sale 2	Sale 3	Sale 4
Sale Price	----				
Conditions of Sale	----				
Adj. Sale Price					
Market Conditions Adj.	----				
Adj. Sale Price	----				
Gross Living Area					
Adj. Sale Price/Sq. Ft.					
Type of Heat					
Type of Garage					
No. of Baths					
No. of Bedrooms					
Fireplace					
Total Gross Adjustments	----				
Total Net Adjustments	----				
# of Adjustments					
Adjusted Sale Price					
Adjusted Sale Price/sq. ft.					

Estimated Value Indicated by Sales Comparison Approach:

_____ x _____ = $ _____

From the market you have extracted the following adjustments:

- Market Conditions Adjustment is 5% Annually
- Garage Adjustment is $6,000 per Stall
- Basement Finish Adjustment is $25.00 PSF
- Condition Adjustment is 5% between Average and Good

To estimate a size adjustment, you have reviewed the following 4 recent sales of single-family properties that are similar except for size.

Sale	Sale Price	Gross Living Area
1	$195,000	1,480
2	$200,000	1,600
3	$190,000	1,350
4	$185,000	1,200

Calculate a size adjustment to be applied to the selected comparable properties

Size Adjustment:_____

Complete adjustment grid on the next page

IMPROVED PROPERTY ADJUSTMENT GRID - PROBLEM

	Subject	*Sale 1*	*Sale 2*	*Sale 3*
Sale Date		June 2014	September 2014	December 2014
Sale Price		$180,000	$170,000	$190,000
Size (sq. ft.)	1,350	1,400	1,300	1,500
# Rooms	6	6	6	7
# Bedrooms	3	3	3	3
Garage Stalls	2	2	2	3
Basement Finish	1,000	1,200	1,000	800
Condition	Average	Average	Average	Good

Mkt. Cond. Adjustment				
Mkt. Cond. Adj. Sale $				
Adj. $/Sq.Ft.				
Adj. $/Room				
Adj. $/Bedroom				
Garage Stalls				
Basement Finish				
Condition				
Adjusted Sale Price				
Size Adjustment				
# of Adjustments				
Gross Adjustments $				
Net Adjustments $				
Adj. Sale Price $				
Adj. Sale Price/Sq.Ft. $				

Indicated Value for Subject: $_____

Appraisal Date: _____June 1, 2015_____

STATISTICS REVIEW

MEASURES OF CENTRAL TENDENCY

Measures of central tendency describe the overall level at which properties are assessed. The first step in calculating any measure of central tendency is to calculate an individual ratio for each sale.

Sales Ratio – The sales ratio is determined by dividing assessed value by sale price.

Sales Ratio = Assessor EMV / Sales Price

Assessor EMV	Sales Price	Sales Ratio
$ 230,500	$ 259,000	.89
$ 197,500	$ 250,000	.79
$ 168,000	$ 200,000	.84
$ 197,800	$ 215,000	.92
$ 175,800	$ 217,000	.81
$ 221,000	$ 260,000	.85
$ 195,800	$ 225,000	.87
$1,386,400	$1,626,000	

Array – Arrangement of ratios in order of magnitude from highest to lowest (or visa versa).

.79 .81 .84 .85 .87 .89 .92

Mean Ratio– The mathematical average of the ratios. Add all ratios together and divide by the number of ratios.

.79 .81 .84 .85 .87 .89 .92 = 5.97 divided by 7 = **.853**
Mean Ratio

Aggregate Mean Ratio – also called Weighted Mean. The aggregate mean ratio is determined by dividing the total Assessor's EVMs for all properties by the total sales prices of all properties. This ratio is used to calculate the Price Related Differential.

Aggregate Mean Ratio = Sum of all Assessor's EMVs / Sum of all Sales Prices

Aggregate Mean Ratio = $\frac{\$1,386,400}{\$1,626,000}$ = **.853 Aggregate Mean Ratio**

Median Ratio - The midpoint or middle ratio in a group of ratios arranged from highest to lowest (or visa versa). When there is an even number of ratios, the median is found by adding the two midpoint ratios together and dividing by two.

.79 .81 .84 **.85** .87 .89 .92
Median

(----- .81 .84 .85 .87 .89 .92)
.86 Median (.85+.87 = 1.72 divided by 2 = .86)

MEASURES OF UNIFORMITY

Measures of uniformity measure the quality and uniformity of the assessment.

Range – The difference between the largest ratio and the smallest ratio. A large range typically indicates poor uniformity. However, the range is highly susceptible to extreme ratios.

Range = Largest Ratio – Smallest Ratio

.92 - .79 = **.13 Range**

Average Absolute Deviation – The average difference between each individual ratio and the median ratio. Add each absolute (disregard +/-) deviation together and divide by the number of ratios. This statistic is used to calculate the COD.

Individual Ratio	Median	Deviation	Absolute Deviation
.79	.85	-.06	.06
.81	.85	-.04	.04
.84	.85	-.01	.01
.85	.85	.00	.00
.87	.85	.02	.02
.89	.85	.04	.04
.92	.85	.07	.07
			.24

AAD = .24 divided by 7 = **Average Absolute Deviation .034**

Coefficient of Dispersion – A measure of uniformity indicating the degree to which individual ratios vary from the median. A low COD indicates a uniform assessment. A high COD indicates a non-uniform assessment.
IAAO standards suggest single family residential CODs should generally be less than 15. A COD under 10 is considered excellent uniformity.

$$\text{COD} = \frac{\text{Average Absolute Deviation}}{\text{Median}} \times 100$$

$$\text{COD} = \frac{.034}{.85} \times 100 = \textbf{COD 4.00}$$

Price Related Differential – Measures the relationship between the mean ratio and the aggregate mean ratio. Divide the mean ratio by the aggregate mean ratio and then multiply by 100. A PRD of 100 is desirable. Based on IAAO guidelines, PRDs between 98 and 103 would still be considered acceptable.

Appraisal uniformity is said to be **Regressive** if high-value properties are under assessed compared to low-value properties. **PRD is greater than 103**

Appraisal uniformity is said to be **Progressive** if high-value properties are over assessed compared to low-value properties. **PRD is less than 98**

$$\text{PRD} = \frac{\text{Mean}}{\text{Aggregate Mean}} \times 100$$

$$\text{PRD} = \frac{.853}{.853} \times 100 = \textbf{PRD 100}$$

STATISTICS – SALES STUDY PROBLEM #1

Round to three decimals in all calculations – 1.111 or 0.999

Calculate the individual sales ratios:

Sale No.	Address	Sale Date	Sale Price	Assessor's 2015 EMV	Sales Ratio
1	552 Maple St.	Dec-13	$212,000	$213,000	
2	46 Bluebird St.	Feb-14	$228,000	$219,000	
3	103 Maple St.	Apr-14	$289,000	$221,000	
4	124 Elm St.	Oct-13	$188,000	$199,000	
5	133 Oak St.	May-14	$350,000	$234,000	
6	224 Pine St.	Mar-14	$333,000	$232,000	
7	466 Oak St.	Apr-14	$360,000	$265,000	
8	251 Ash St.	Nov-13	$308,000	$254,000	
9	356 Walnut St.	Aug-14	$230,000	$221,000	
10	52 Robin Way	Jan-14	$250,000	$246,000	
11	62 Finch Way	May-14	$300,000	$208,000	

Mean: _____ Aggregate Mean Ratio: _____

Array ratios:

Array Ratios	Absolute Deviation from Median Ratio

Median: _____

Range: _____

Average Absolute Deviation from the Median – AAD: _____

COD: _____

PRD: _____

What determinations can you make about the assessment's quality and uniformity?

STATISTICS – SALES STUDY PROBLEM #2

Round to three decimals in all calculations – 1.111 or 0.999

Calculate the individual sales ratios:

Sale No.	Address	Sale Date	Sale Price	Assessor's 2015 EMV	Sales Ratio
1	128 13th St.	Dec-13	$175,000	$157,500	
2	564 18th St.	Feb-14	$164,000	$142,700	
3	223 15th St.	May-14	$154,000	$126,300	
4	103 View Ln.	Oct-13	$193,000	$154,400	
5	400 11th St.	Apr-14	$187,000	$166,400	
6	348 16th St.	May-14	$171,000	$131,700	
7	222 Look Ln.	Aug-14	$198,000	$182,200	
8	551 17th St.	Mar-14	$159,000	$144,700	
9	454 15th St.	Jan-14	$177,000	$146,900	
10	367 12th St.	Nov-13	$149,000	$140,100	

Mean: _____ Aggregate Mean Ratio: _____

Array ratios:

Array Ratios	Absolute Deviation from Median Ratio

Median: _____

Range: _____

Average Absolute Deviation from the Median – AAD: _____

COD: _____

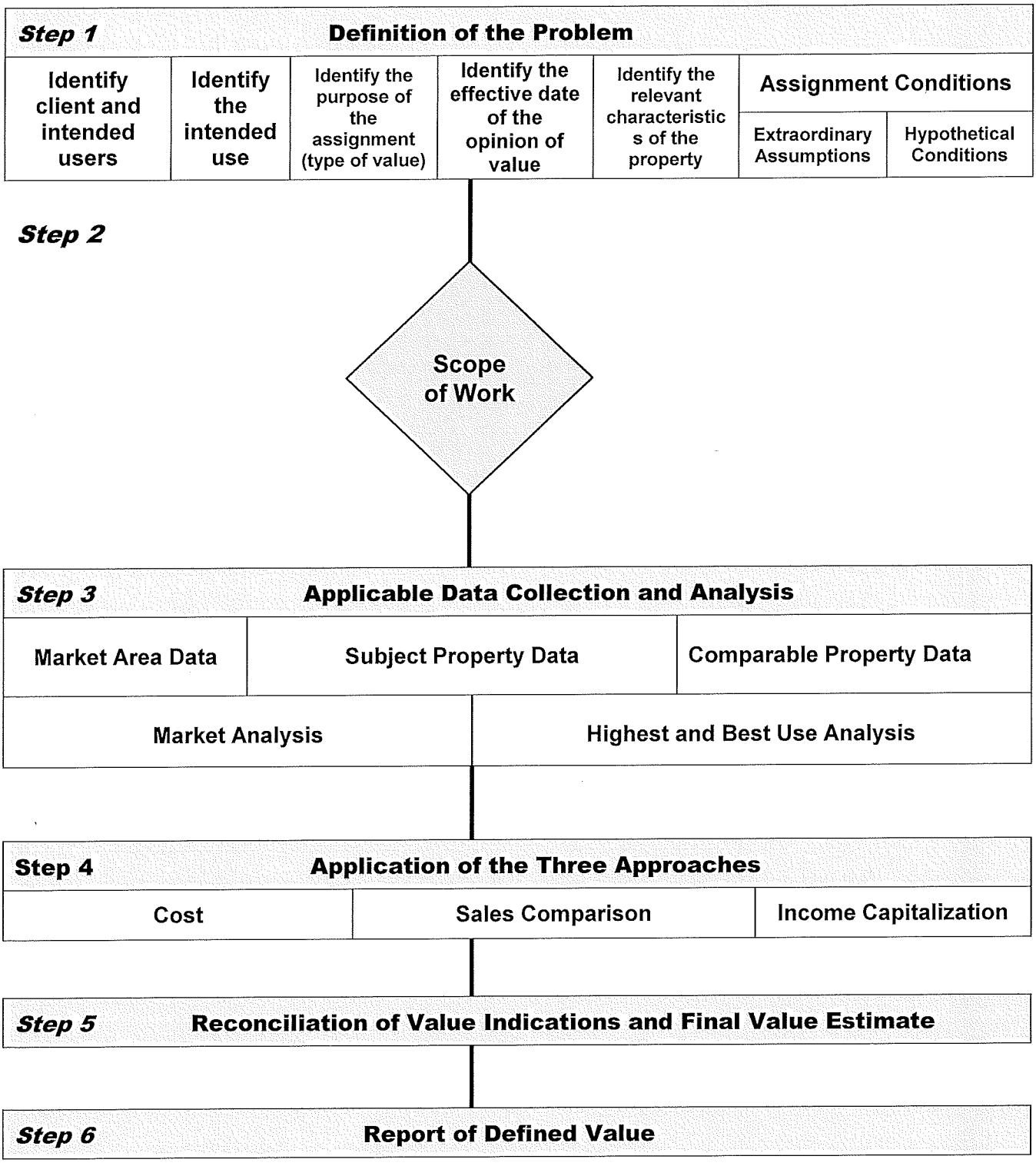
PRD: _____

What determinations can you make about the assessment's quality and uniformity?

Part 2 – Solutions

Preparing for the Minnesota Residential Case Study Exam

THE APPRAISAL PROCESS MODEL - SOLUTION



TERMINOLOGY QUIZ SOLUTION

Match the following terms:

P	1. Anticipation	A.	The basis for applying the adjustments in the sales comparison approach.
G	2. Balance	B.	States that a property must be valued with a single use for the entire property.
I	3. Change	C.	The amount of product that producers are willing to sell under various conditions during a given period.
J	4. Competition	D.	A market derived figure that represents the amount a developer expects to receive for his or her contribution to a project including risk.
K	5. Conformity	E.	Expenditures for the labor and material used in the construction of improvements.
B	6. Consistent Use	F.	The portion of a building that is above grade.
A	7. Contribution	G.	Maximum value is obtained when the four agents of production attain a state of equilibrium.
H	8. Demand	H.	Quantities of various goods that people are willing and able to buy during some period, given the choices available to them.
E	9. Direct Costs	I.	The tendency of social and economic forces affecting supply and demand to alter over time.
Q	10. Eminent Domain		
D	11. Entrepreneurial Profit	J.	Availability must be in harmony with demand.
R	12. Escheat		
O	13. Externalities	K.	The value of property depends in part, in its relationship to its surroundings.
M	14. Indirect Costs	L.	A building's entire foundational structure, which is below grade.
C	15. Supply	M.	Expenditures for items other than labor and material.
N	16. Substitution	N.	Market value of a property tends to be set by the cost of acquiring an equally desirable and valuable property.
L	17. Substructure	O.	Factors external to a property can have either positive or negative effects on it value.
F	18. Superstructure	P.	Present worth of future benefits associated with ownership of property.
		Q.	Taking private property for public use.
		R.	Transfers the property of a person who dies without heirs to the state.

DEFINITIONS - SOLUTION

In your own words, briefly define the following terms:

1. Real Estate

   Land and all things that are a natural part of it as well as things that are attached to it by people

2. Real Property

   Includes all the interests, benefits, and rights inherent in the ownership of real estate

3. Market Value

   An expected price that should result under specific market conditions

4. Cost

   The total dollar expenditure for a structure

5. Price

   What a particular purchaser agreed to pay and a particular seller agreed to accept

6. Replacement Cost

   The estimated cost at current prices to construct a building with utility equivalent to the subject using modern materials, design, and layout

7. Reproduction cost
   The cost to construct at current prices an exact duplicate of the building with the same materials, design, and layout

REAL ESTATE BASICS - SOLUTION

List the four forces affecting Real Estate and provide an example of each.

1.

***Social forces**-total population, typical family size, unemployment rate, crime rate*

2.

***Economic forces**-wage levels, price and rent levels, turnover and vacancy, new construction, property taxes, utility costs, foreclosure rate*

3.

***Governmental forces**-fire and police protection, zoning, building codes, special assessments*

4.

***Environmental** forces-topography and soil, location, size and shape of lots, proximity to support facilities, drainage, utilities*

List the four tests of highest and best use.

1.
Legally permissible

2.
Physically possible

3.
Financially feasible

4.
Maximally productive

THREE APPROACHES TO VALUE - SOLUTION

List the steps in the three approaches to value:

Cost

1. *Develop an opinion of land value*
2. *Estimate cost new of improvements*
3. *Apply depreciation to the cost new*
4. *Add depreciated value of improvements to land value*

Income

The first step in the income approach is to estimate the economic rent for the subject property. The next step is to calculate the gross rent multiplier. An estimate of value can then be calculated by multiplying the monthly gross rent by the gross rent multiplier.

Sales Comparison

In the sales comparison approach, the estimate of the subject property's value is determined through a comparison of similar properties, which have sold. Market derived adjustments are then made to the properties that have sold in order to derive an estimated market value for the subject property

UNITS & ELEMENTS OF COMPARISON - SOLUTION

List possible units of comparison for:

Vacant Residential Sites	Improved Residential Properties
price per front foot	*price per bedroom*
price per square foot	*price per room*
price per site	*price per square foot*

List possible elements of comparison for:

Vacant Residential Sites	Improved Residential Properties
market conditions	*market conditions*
location	*location*
topography	*physical characteristics*

SOLUTION

Analyze the following subject neighborhood sales to estimate a market conditions adjustment and complete the site valuation grid on the following page.

Site Sale #1	Date: July 2012	Sale Price: $33,000
	Date: December 2014	Sale Price: $37,800

Indicated market conditions adjustment **.0050** per month

Indicated market conditions adjustment **.06** annually

$37,800
-33,000
$4,800 ÷ $33,000 = .1455 .1455 ÷ 29 months = .0050 x 12 = .06

Site Sale #2	Date: August 2013	Sale Price: $40,000
	Date: November 2014	Sale Price: $43,000

Indicated market conditions adjustment **.0050** per month

Indicated market conditions adjustment **.06** annually

$43,000
-40,000
$3,000 ÷ $40,000 = .0750 .0750 ÷ 15 months = .0050 x 12 = .06

Indicated market conditions adjustment for subject site **.005** per month and

6.0% annually.

COST APPROACH SITE VALUATION WORKSHEET - SOLUTION

1. Based on the site sales provided on page 7, complete the following data/adjustment grid to list and analyze both the units of comparison and elements of comparison. *This grid may or may not reflect the number of required adjustments.*

	Subject	Sale #1	Sale #2	Sale #3	Sale #4	% Difference
Sale Price		$55,000	$50,000	$45,000	$60,000	
Sale Date	03/2015	10/2014	03/2014	01/2014	12/2014	
Sq. Ft.	14,000	15,000	12,000	13,000	15,000	
Front Ft.	100	100	90	100	90	
Mkt. Cond. Adj. .005/mo – 6%/year		1,375	3,000	3,150	900	
Mkt. Cond. Adjusted Sale Price		56,375	53,000	48,150	60,900	
Adj. Sale Price/Site		56,375	53,000	48,150	60,900	26%
Adj. Sale Price/Sq. Ft.		3.76	4.42	3.70	4.06	19%
Adj. Sale Price/Front Ft.		564	589	481	677	40%
Location Adjustment				5%	-5%	
				+2,408	-3,045	
Adjusted Sale Price		56,375	53,000	50,558	57,855	
Adjusted Sale Price/Sq. Ft.		3.76	4.42	3.89	3.86	
# Adjustments		1	1	2	2	
Gross Adjustments		1,375	3,000	5,558	3,945	
Net Adjustments		1,375	3,000	5,558	-2,145	

2. Estimate the site value of the subject based on the units of comparison and elements of comparison.

Sale #1 had one adjustment and the lowest gross adjustments.

$3.76 x 14,000 = $52,640

RESIDENTIAL SITE VALUATION: ALLOCATION METHOD - SOLUTION

1. Since Sale #2 is greater than $250,000, its site value is 18% of its total value according to the recent study. So,

   $275,000 x .18 = $49,500

2. The site value can be found by using the land-to-improvement ratio to allocate the appropriate part of the $250,000 sales price to the site. For every one dollar of site value, there would be four dollars of improvement value, for a total of five dollars. Therefore, one of the five total parts is site.

1÷5 = .20 = 20%	Find % attributable to site
20% x $250,000	Multiply % times total property value
$50,000	Equals site value

RCN PROBLEMS - SOLUTION

1. A house contains 3,100 square feet of building area. There is an attached garage measuring 42 by 24 feet. The square foot reproduction cost is estimated at $95.00 for the building area and $25.00 for the garage. The total replacement cost new of the entire structure is _____.
   a. $294,500
   b. $319,700
   c. $102,700
   d. $390,300

2. The most detailed method of estimating the cost new of a structure is the
   a. Quantity survey method
   b. Unit-in-place method
   c. Trade breakdown or builder's method
   d. Segregated cost method

3. The unit-in-place cost-estimating method is
   a. Based on historical cost
   b. Based on the market-extracted costs per square foot of the building
   c. Based on the cost of each component of the building, including all labor and materials
   d. Based on a computerized printout of all labor, materials, and extras.

4. A cost-estimating method in which appraisers estimate the current cost of construction based on the amount paid for the building when it was built is called
   a. Cost index trending
   b. Segregated cost
   c. Cost engineered services
   d. Unit-in-place method

5. When appraising an improved property with substantial functional losses, you should
   a. Be conservative in the cost new estimate to accommodate those losses.
   b. Accurately estimate the cost and deal with the obsolescence in the depreciation estimate
   c. Not apply the cost approach because it is too hard
   d. Apply the cost approach because it is the only method you have that will give an accurate value

6. The subject improvement is a 2,855 square-foot, two-story residence with a 1,200 square foot basement with 900 square foot (minimal) finishing in the basement. The basement floor is 8 inch concrete, and the basement area is all subterranean (not walkout). There is 726 square feet, three-car attached garage, a 466 square foot glass-enclosed porch with a wood ceiling and wood walls. There is wood siding and an asphalt shingle roof. The house has 10 rooms, four bedrooms, 2-1/2 baths, one masonry fireplace, and trim and finish commensurate with the market. It has typical kitchen and bath finishes. The floor coverings are 90% carpeted and 10% ceramic. The built-in kitchen appliances include a range/oven, dishwasher, disposal unit, and microwave. There is a gas forced-air furnace and central air-conditioning.

Worksheet for Cost-Estimating Problem

House	2,855 sq. ft. @	66.30	=	189,287
Roof	1,425 sq. ft. @	- 0.78	=	-1,112
Fireplace			=	4,700
Carpet	90% of 2,855 sq.ft.	4.92		12,642
Tile	10% of 2,855 sq. ft.	13		3,712
Appliances			=	3,039
Central A/C	2.855 sq. ft. @	1.70	=	4,854
Basement	1,200 sq. ft. @	17.65	=	21,180
Basement finish	900 sq. ft. @	7.59	=	6,831
Garage	726 sq. ft. @	24.98	=	18,135
Enclosed porch	466 sq. ft. @	28.55	=	13,304
Porch ceiling	466 sq. ft. @	4.01	=	1,869
Subtotal				**278,441**
Multipliers		1.08 x 1.03	=	1.11
Total				**309,070**

ECONOMIC LIFE ESTIMATION - SOLUTION

	Sale #1	Sale #2	Sale #3
Sale Price	$225,000	$230,000	$210,000
Site Value	(125,000)	(125,000)	(125,000)
Improvement Value	$100,000	$105,000	$ 85,000
RCN (Improvements)	$141,760	$141,920	$120,720
Indicated Value of Improvements	(100,000)	(105,000)	(85,000)
Accrued Depreciation	$ 41,760	$ 36,920	$ 35,720
Percent Depreciation	41,760 ÷ 141,760 29.5%	36,920 ÷ 141,920 26.0%	35,720 ÷ 120,720 29.6%
Indicated Effective Age	30	28	30
Percent Annual Depreciation	(.295 ÷ 30) x 100 0.983%	(.260 ÷ 28) x 100 0.929%	(.296 ÷ 30) x 100 0.987%
Estimated Total Economic Life (Years)	1 ÷ .00983 102	1 ÷ .00929 108	1 ÷ .00987 101

ECONOMIC LIFE ESTIMATES AND DEPRECIATION
Solution #1

A house with a current RCN of $150,000 was built 25 years ago is in good condition. Based on your inspection, you estimate the effective age to be 20 years and a remaining life of 60 years.

What is the chronological age of the structure? **25 Years**

What is the effective age of the structure? **20 Years**

What is the total economic life estimate of the structure? **20 + 60 = 80 Years**

What is the remaining economic life of the structure? **60 Years**

Calculate the accrued depreciation of the structure on lump sum and percentage basis.

20/80 = .25 of $150,000 = $37,500

Problem #2

Market Conditions Adjustment Calculations

Property #1		Property #2	
1st Sale - June 2011	$150,000	1st Sale – October 2012	$160,000
2nd Sale - August 2014	$175,000	2nd Sale - April 2015	$180,000

Calculate the market conditions adjustment.

$175,000
(150,000)
$ 25,000

$25,0000/$150,000 = .1667

.1667/38 months =
.0044 per month x 12 months =
5.26 annual time adjustment
(market conditions)

$180,000
(160,000)
$ 20,000

$20,000/$160,000 = .1250

.1250/30 months =
.0042 per month x 12 months =
5.0 annual time adjustment
(market conditions)

DEPRECIATION EXAMPLES - SOLUTION

Provide an example of the following forms of depreciation:

1. Physical curable

   Peeling paint, broken window, plumbing repairs

2. Physical Incurable

   5-year old furnace, new roof, foundation

3. Functional Curable

   Outdated fixtures, lack of central-air, lack of second garage stall

4. Functional Incurable

   Very high ceilings, four -car garage stall in a market with two stalls, HVAC system with excessive cooling capacity

5. External Obsolescence

   Proximity to a commercial district, over supply in the market, poor access

DEPRECIATION PROBLEMS - SOLUTION

1. The following information on incurable short-lived building components is provided.

	Current Reproduction Cost	*Actual Age*	*Total Physical Life*
Roof Cover	$6,000	10 years	30 years
Floor Cover	$12,000	5 years	12 years
Painting	$5,000	5 years	10 years

Calculate the incurable physical deterioration in the short-lived components.

Problem 1 Solution

	Current Reproduction Cost	*Actual Age*	*Total Physical Life*	*Depreciation* *%*	*$*
Roof Cover	$6,000	10 years	30 years	.33	$1,980
Floor Cover	$12,000	5 years	12 years	.42	5,040
Painting	$5,000	5 years	10 years	.50	2,500
Total incurable physical deterioration, short-lived components					$9,520

2. A residential duplex is to be converted into a single-family unit. It presently has two furnaces and each is capable of servicing the entire building. The following data are provided.

Reproduction cost of one furnace	$6,000
Physical deterioration charged to date	$1,000
Cost to remove one furnace and refinish space	$ 500

Calculate the curable functional obsolescence caused by the superadequacy.

Problem 2 Solution

Reproduction cost of one furnace	$6,000
Physical deterioration already charge	-1,000
Cost to remove and finish space	+500
Curable functional obsolescence caused by superadequacy	$5,500

3. The kitchen in a single-family residence has kitchen cabinets that are not acceptable in the current market. The following information is provided.

Cost of new cabinets, installed	$15,000
Reproduction cost of existing cabinets (installed during construction)	$10,000
Accrued depreciation in existing cabinets	$ 8,000

Calculate the curable functional obsolescence caused by this deficiency requiring substitution or modernization.

Problem 3 Solution

Reproduction cost of new cabinets		$15,000
Reproduction cost of existing cabinets (installed during construction)	$10,000	
Accrued depreciation	-8,000	
Remaining value of existing cabinets		-$2,000
Curable functional obsolescence caused by a deficiency requiring substitution or modernization		$13,000

4. The building being appraised has a current reproduction cost of $200,000, an effective age of 14 years, and a total economic life of 80 years.

Calculate the accrued depreciation and improvement value of this building using the economic age-life method.

Problem 4 Solution

Effective age/total economic life = % depreciated

14÷80 = 0.175, or 17.5%
0.175 x $200,000 = $35,000 depreciation

Current reproduction cost	$200,000
Accrued depreciation	$ 35,000
Depreciated value of improvements	$165,000

5. The following data are provided.

	Sale 1	Sale 2	Sale 3
Sale price	$199,000	$235,000	$164,000
Land value	$60,000	$70,000	$50,000
Current reproduction cost	$250,000	$315,000	$210,000

Calculate the depreciation for each sale as a percentage of the current reproduction cost of the improvements.

Problem 5 Solution

	Sale 1	Sale 2	Sale 3
Sale price	$199,000	$235,000	$164,000
Estimated land value	-$60,000	-$70,000	-$50,000
Present value of improvements	$139,000	$165,000	$114,000
Estimated current reproduction cost	$250,000	$315,000	$210,000
Improvement value	-139,000	-165,000	-114,000
Indicated accrued depreciation	$111,000	$150,000	$96,000
Depreciation as % of reproduction cost	44%	48%	46%

6. A comparable property was sold for $250,000. Market analysis reveals that the following adjustments are appropriate.

Market conditions (time)	plus 15%
Location	minus 5%
Conditions of sale	minus 10%
Physical characteristics	plus 15%
Financing	minus 5%

Make these adjustments to the comparable's sale price to develop an adjusted indication of value for the subject property. Consider the order of adjustments as well as their amounts.

Problem 6 Solution

First make the adjustments for financing terms, conditions of sale, and market conditions, and then adjust the sale to the subject property for differences in location and physical characteristics.

Element	Market-Derived Adjustment	Adjustment to Price of Comparable
Sale Price		$250,000
Adjustment		
Financing terms	-5%	-$12,500
Adjusted price		$237,500
Adjustment		
Conditions of sale	-10%	-$23,750
Adjusted price		$213,750
Adjustment		
Market conditions (time)	+15%	+$32,063
Adjusted price		$245,813
Adjustment		
Location	-5% (of 245,813)	-$12,291
Physical characteristics	+15% (of 245,813)	+$36,872
Adjustment indication		
Of value		$270,394

The following data have been calculated for use in the cost approach.

Current reproduction cost		
Building improvements		$175,000
Site improvements	$ 15,000	
Physical deterioration		
Curable		$ 5,000
Incurable – long-lived		$ 25,000
Incurable – short-lived		$ 5,000
Functional obsolescence		
Curable		$ 5,000
Incurable	$ 0	
External obsolescence		$ 7,000
Depreciation of site improvements		$ 5,000
Site value	$ 60,000	

Calculate the indicated value of the fee simple interest in the subject property using the cost approach.

Problem 7 Solution

Reproduction cost of building improvements			$175,000
Physical deterioration			
Curable	$ 5,000		
Incurable – long-lived	$25,000		
Incurable – short-lived	$ 5,000		
		$35,000	
Functional obsolescence			
Curable	$ 5,000		
Incurable	$ 0		
		$ 5,000	
External obsolescence		$ 7,000	
Total accrued depreciation			-$ 47,000
Depreciated value of building improvements			$128,000
Reproduction cost of site improvements		$15,000	
Depreciation of site improvements		- $5,000	
Depreciated value of site improvements			+$10,000
Total depreciated value of improvements			$138,000
Estimated site value			$ 60,000
Value of fee simple interest by cost approach			$198,000

The following table presents information on six sales that an appraiser considers comparable to the single-family residence being appraised.

	Subject	Sale 1	Sale 2	Sale 3	Sale 4	Sale 5	Sale 6
Price		$175,000	$174,000	$170,000	$180,000	$182,000	$179,000
Date	Current	Current	1 year old	Current	1 year old	Current	Current
Size	2,000 sq.ft.	2,000 sq.ft.	2,000 sq.ft.	1,500 sq.ft.	2,000 sq.ft.	2,000 sq.ft.	1,500 sq.ft.
Location		Similar	Similar	Similar	Superior	Similar	Superior
Age	5 years	5 years	5 years	5 years	5 years	New	5 years
Basement	Yes	No	No	No	No	Yes	Yes

8. Calculate appropriate adjustments for the variables listed.
9. Create a market data grid for the comparison and adjustment of data.
10. Derive a value indication for the subject property.

Problem 8 Solution

Market conditions	Sale 1 – current	$ 175,000
	Sale 2 – 1 year old	-$ 174,000
	Adjustment for market conditions	$ 1,000
Size	Sale 1 – 2,000 sq. ft.	$ 175,000
	Sale 3 – 1,500 sq. ft.	-$ 170,000
	Adjustment for size	$ 5,000
Location	Sale 4 – Superior	$ 180,000
	Adjustment for market condition	+$ 1,000
	Sale 4 adjusted	$ 181,000
	Sale 1 – similar	-$ 175,000
	Adjustment for location	$ 6,000
Age	Sale 5 – new	$ 182,000
	Adjustment for basement	-$ 3,000
	Sale 5 adjusted	$ 179,000
	Sale 1 – 5 years old	-$175,000
	Adjustment for age	$ 4,000
Basement	Sale 6 – with basement	$ 179,000
	Adjustment for size	+$ 5,000
	Adjustment for location	-$ 6,000
	Sale 6 adjusted	$ 178,000
	Sale 1 – no basement	-$175,000
	Adjustment for basement	$ 3,000

Problem 9 Solution

	Sale 1	Sale 2	Sale 3	Sale 4	Sale 5	Sale 6
Price	$175,000	$174,000	$170,000	$180,000	$182,000	$179,000
Market Conditions		+$1,000		+$1,000		
Size			+$5,000			+$5,000
Location				-$6,000		-$6,000
Age					-$4,000	
Basement	+$3,000	+3,000	+$3,000	+$3,000		
Indicated value of subject	$178,000	$178,000	$178,000	$178,000	$178,000	$178,000

Problem 10 Solution

The value indication for the subject property is $178,000.

DEPRECIATION MULTIPLE CHOICE PROBLEMS - SOLUTIONS

1. An incurable functional problem is best defined as:
   a. An item that cannot be physically cured.
   b. An item that will not return as much in value as it costs to fix.
   c. An item that is already cured.
   d. An item that is scheduled to be cured but has not yet been cured.

2. If a window has an effective age of 10 years and a remaining economic life of 25, the percentage of depreciation (rounded) is:
   a. 20%
   b. 30%
   c. 40%
   d. 50%

3. A property has overhead garage doors that are 13 years old. It costs $1,900 to replace. Because the inclement weather comes out of the northwest, these doors typically last 15 years if they face the west and 25 years if they face east. This door faces east. What is the amount of value left in this item?
   a. $253
   b. $912
   c. $988
   d. $1,647

4. Effective age is
   a. Actual age of property with better-than-normal maintenance.
   b. Total economic life minus remaining economic life.
   c. Total utility minus diminished utility.
   d. Total economic life minus actual age.

5. An item of depreciation is curable if
   a. The cost to cure is less than the expected increase in value.
   b. The cost to cure is no greater than the reproduction cost.
   c. The cost to cure is no greater than the replacement cost.
   d. It has any remaining economic life.

6. A property has a poor floor plan because it has only 1-1/2 bathrooms in a market that clearly requires 2 or 2-1/2 bathrooms. This problem could be corrected for about $5,500 by moving some interior walls around. The floor plan problem is fairly common in this market, and there is enough data to show that homes with this problem sell for $160,000 and homes without the problem (i.e., with 2 baths) sell for $170,000. This house is 50 years old. Adding the half bath during construction would cost $1,000. This problem is best identified as:
   a. Physical curable depreciation.
   b. Functional curable obsolescence.
   c. External curable obsolescence.
   d. Functional incurable obsolescence.

Use this data for Questions 7 through 10:

The residence you are appraising is 10 years old. You estimate reproduction cost at $128,700. Your inspection of the property found only one item needing immediate repair. The garage door opener is broken, which would cost $450 to repair. The short-lived items are scheduled as follows:

Item	Age	Life	Cost New	Depreciation
Roof shingles	10	25	$6,500	$2,600
Furnace	10	20	$3,500	$1,750
Carpets	4	8	$8,500	$4,250
Vinyl floor covers	0	8	$5,500	$0
Kitchen and bathroom finishes	10	30	$15,000	$5,000
Exterior doors	10	25	$4,400	$1,760
Windows	10	35	$2,900	$828
Total			$46,300	$16,188

This home has only 1-1/2 baths, which is clearly deficient. A number of homes in the subdivision have had the half bath converted to a full bath by removing a closet and installing a shower. This conversion costs about $2,000. Adding this shower during construction would cost $1,000. Comparable sales (with the same bathroom problem) indicate the following depreciation overall:

	Sale 1	Sale 2	Sale 3	Sale 4
Sale Price	$89,000	$99,000	$78,000	$88,000
Estimated site value	$17,000	$19,000	$16,000	$17,000
Calculated building value	$72,000	$80,000	$62,000	$71,000
Estimated reproduction cost	$99,500	$90,000	$80,000	$77,000
Less calculated building value	-$72,000	-$80,000	-$62,000	-$71,000
Calculated depreciation	$27,500	$10,000	$18,000	$6,000
Percentage depreciation	27.64%	11.11%	22.50%	7.79%
Age of improvement	18	7	15	5
Percentage depreciation per year	1.54%	1.59%	1.50%	1.56%

7. Estimate the depreciation for curable physical deterioration.

Garage Door Repairs = $450.00

8. Estimate the depreciation for functional obsolescence.

Conversion Costs =	**$2,000**
Less Cost if Installed in New Construction -	**$1,000**
Difference =	**$1,000**

9. Estimate the depreciation for short-lived items.

Item	Age	Life	Cost New	Depreciation
Roof shingles	10	25	$6,500	$2,600
Furnace	10	20	$3,500	$1,750
Carpets	4	8	$8,500	$4,250
Vinyl floor covers	0	8	$5,500	$0
Kitchen and bathroom finishes	10	30	$15,000	$4,995
Exterior doors	10	25	$4,400	$1,760
Windows	10	35	$2,900	$829
Total			$46,300	**$16,184**

10. Estimate the depreciation for long-lived items.

Total RCN	**$128,700**
Less RCN Short-lived items	**(46,300)**
Equals RCN Long-Lived items	**$82,400**

Depreciation of 0.0155 per year
(10 years x .0155 annual depreciation) = 15.50%

$82,400 x .1550 = 12,772
Long-Lived Items Depreciation

DEPRECIATION CALCULATED FROM THE MARKET - SOLUTION

	Sale 1	**Sale 2**
Sale Price	$245,000	$255,000
Less Site Value	-$50,000	-$50,000
Market Value of Improvements	$195,000	$205,000
Replacement Cost New	$250,000	$260,000
Less Market Value of Improvements	-$195,000	-$205,000
Estimated Depreciation	$55,000	$55,000
Converted to Percentage	$55,000/$250,000 = .22	$55,000/$260,000 = .21
Subject Property		
Replacement Cost New		$255,000
Less Depreciation (22%)		-$56,100
Replacement Cost New Less Depreciation		$198,900
Plus Site Value		+$50,000
Total Property Value		$248,900

CALCULATION OF GRM - SOLUTION

Comparable Sale	Verified Sale Price	Verified Monthly Rent	Indicated GRM
1	$190,500	$1,800	106
2	$199,500	$1,850	108
3	$195,000	$1,775	110
4	$210,500	$1,950	108
5	$200,000	$1,800	111
6	$212,500	$1,950	109
7	$197,500	$1,810	109
8	$225,000	$2,025	111
9	$192,500	$1,800	107
10	$205,500	$1,850	111

Average / Mean	**109**
Median	**109**

INCOME APPROACH
SOLUTION

	Subject	*Rental #1*	*Rental #2*	*Rental #3*
Square Feet	1,230	1,210	1,250	1,150
# of Rooms	6	5	6	5
# of Bedrooms	3	2	3	2
Monthly Rent		$800	$800	$750

Units of Comparison Analysis

	Rental #1	*Rental #2*	*Rental #3*
Rent / SF	$0.66	$0.64	$0.65
Rent / Room	$160.00	$133.33	$150.00
Rent / Bedroom	$400.00	$266.66	$375.00

Best Unit of Comparison	Rent/Sq. Ft.
Range	$0.66 - $0.64 (Avg./Med. = $.065)
Market Rent	$800

GRM Calculation

Sale Price	$134,000	162.4
Monthly Rent	$825	
Sale Price	$136,000	170
Monthly Rent	$800	
Sale Price	$135,000	168.8
Monthly Rent	$800	

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Indicated GRM: 167

Indicated Value

$800	X	167	=	$133,600
Rent	X	Multiplier	=	Value

UNITS OF COMPARISON – IMPROVED
SOLUTION

	Subject	*Sale 1*	*Sale 2*	*Sale 3*	*Sale 4*
Sale Price		$150,000	$142,000	$160,000	$138,000
Square Feet	1,250	1,200	1,050	1,300	1,000
# Rooms	6	6	5	6	5
# Bedrooms	3	3	3	3	3

Use the following grid to determine the best unit of comparison.

	Subject	*Sale 1*	*Sale 2*	*Sale 3*	*Sale 4*
Square Feet	1,250	1,200	1,050	1,300	1,000
Price/Sq. Ft.		$125	$135	$123	$138
# Rooms	6	6	5	6	5
Price/Room		$25,000	$28,400	$26,700	$27,600
# Bedrooms	3	3	3	3	3
Price/Bedroom		$50,000	$47,300	$53,333	$46,000

Price/Sq. Ft. Range $123 to $138 12%

Price/Room Range $25,000 to $28,400 14%

Price/Bedroom Range $46,000 to $53,333 16%

PAIRED SALES ANALYSIS - SOLUTION

What lump-sum dollar amount does a finished basement contribute to the value of a single-family house in the market represented by these properties?

Sale (basement) – sale (no basement) = basement value.

Stratum 1 (houses with single-car garage)

(Sale 1 – Sale 2)	145,600 - 140,000 = $5,600
(Sale 1 – Sale 3)	145,600 - 140,200 = $5,400

Stratum 2 (houses with double-car garages)

(Sale 4 – Sale 5)	151,600 - 146,000 = $5,600
(Sale 4 – Sale 6)	151,600 - 146,100 = $5,500
(Sale 4 – Sale 7)	151,600 - 146,200 = $5,400

A finished basement contributes between $5,400 and $5,600 to the value of a single-family house in this market.

COMPARATIVE SALES WORKSHEET - SOLUTION

	Subject	Sale 1	Sale 2	Sale 3	Sale 4
Sale Price	----	$280,500	$275,200	$278,000	$291,500
Conditions of Sale	----				-6,000
Adj. Sale Price					285,500
Market Conditions Adj.	----	+28,050	----	+27,800	+14,275
Adj. Sale Price	----	308,550	275,200	305,800	299,775
Gross Living Area	1,400	1,480	1,420	1,380	1,520
Adj. Sale Price/ Sq. Ft.		$208.48	$193.80	$221.59	$197.22
Type of Heat	FHA	-1,100	----	-1,100	-1,100
Type of Garage	2GA	----	+6,000	----	----
No. of Baths	One	-5,000	----	-5,000	-5,000
No. of Bedrooms	Three	-12,000	----	----	-12,000
Fireplace	None	-6,000	----	-4,000	-6,000
Total Gross Adjustments		52,150	6,000	37,900	44,375
Total Net Adjustments	----	+3,950	+6,000	+17,700	-15,825
# of Adjustments	----	5	1	4	6
Adjusted Sale Price	----	$284,450	$281,200	$295,700	$275,675
Adjusted Sale Price/Sq. Ft. (use subject SF)	----	$203.18	$200.86	$211.21	$196.91

Most weight given to Sale #2 (least number and amount of adjustments)

Estimated Value Indicated by Sales Comparison Approach: $201 x 1,400 = $281,400

SOLUTION: From the market you have extracted the following adjustments:

- Market Conditions Adjustment is 5% Annually
- Garage Adjustment is $6,000 per Stall
- Basement Finish Adjustment is $25.00 PSF
- Condition Adjustment is 5% between Average and Good

To estimate a size adjustment, you have reviewed the following 4 recent sales of single-family properties that are similar except for size.

Sale	Sale Price	Gross Living Area
1	$195,000	1,480
2	$200,000	1,600
3	$190,000	1,350
4	$185,000	1,200

Calculate a size adjustment to be applied to the selected comparable properties

Paired Sales 1 & 2

$200,000-$195,000 = $5,000 $5,000 ÷ 120 = $41.67
(GLA) 1,600 – 1,480 = 120

Paired Sales 1 & 3

$195,000 - $190,000 = $5,000 $5,000 ÷ 130 = $38.46
(GLA) 1,480 – 1,350 = 130

Paired Sales 1 & 4

$195,000 -$185,000 = $10,000 $10,000 ÷ 280 = $35.71
(GLA) 1,480 -1,200 = 280

Paired Sales 2 & 3

$200,000 - $190,000 = $10,000 $10,000 ÷ 250 = $40.00
(GLA) 1,600 -1,350 = 250

Paired Sales 2 & 4

$200,000 - $185,000 = $15,000 $15,000 ÷ 400 = $37.50
(GLA) 1,600 – 1,200 = 400

Paired Sales 3 & 4
$190,000 - $185,000 = $ 5,000 $5,000/150 = $33.33
(GLA) 1,350 – 1,200 = 150

Mean $37.78 Median $37.98

Size Adjustment: **$38.00**

Indicated Value for Subject: **$178,200 +/-**

Appraisal Date: June 1, 2015

IMPROVED PROPERTY ADJUSTMENT GRID - SOLUTION

	Subject	*Sale 1*	*Sale 2*	*Sale 3*
Sale Date		June 2014	September 2014	December 2014
Sale Price		$180,000	$170,000	$190,000
Size (sq. ft.)	1,350	1,400	1,300	1,500
# Rooms	6	6	6	7
# Bedrooms	3	3	3	3
Garage Stalls	2	2	2	3
Basement Finish	1,000	1,200	1,000	800
Condition	Average	Average	Average	Good

Mkt. Cond. Adjustment		12 months 5%	9 months 3.75%	6 months 2.5%
Mkt. Cond. Adj. Sale $		$189,000	$176,375	194,750
Adj. $/Sq. Ft.- 4.5%		$135.00	$135.67	129.80
Adj. $/Room- 13%		$31,500	$29,396	$27,821
Adj. $/Bedroom- 10.4%		$63,000	$58,792	$64,917
Garage Stalls	2	2	2	3 -$6,000
Basement Finish	1,000 sq. ft.	1,200 sq. ft. -$5,000	1,000 sq. ft.	800 sq. ft. +$5,000
Condition	Average	Average	Average	Good -$9,738
Size Adjustment	1,350 sq. ft.	1,400 sq. ft. -$1,900	1,300 sq. ft. +$1,900	1,500 sq. ft. -$5,700
# of Adjustments		3	2	5
Gross Adjustments $		$15,900	$8,275	$31,188
Net Adjustments $		$2,100	$8,275	-$11,688
Adj. Sale Price $		$182,100	$178,275	$178,312
Adj. Sale Price/Sq. Ft. $	1,350	$134.89	$132.06	$132.08

STATISTICS – SOLUTION

SALES STUDY PROBLEM #1

Round to three decimals in all calculations – 1.111 or 0.999

Calculate the individual sales ratios:

Sale No.	Address	Sale Date	Sale Price	Assessor's 2015 EMV	Sales Ratio
1	552 Maple St.	Dec-13	$212,000	$213,000	1.005
2	46 Bluebird St.	Feb-14	$228,000	$219,000	0.961
3	103 Maple St.	Apr-14	$289,000	$221,000	0.765
4	124 Elm St.	Oct-13	$188,000	$199,000	1.059
5	133 Oak St.	May-14	$350,000	$234,000	0.669
6	224 Pine St.	Mar-14	$333,000	$232,000	0.697
7	466 Oak St.	Apr-14	$360,000	$265,000	0.736
8	251 Ash St.	Nov-13	$308,000	$254,000	0.825
9	356 Walnut St.	Aug-14	$230,000	$221,000	0.961
10	52 Robin Way	Jan-14	$250,000	$246,000	0.984
11	62 Finch Way	May-14	$300,000	$208,000	0.693
		Totals	$3,048,000	$2,512,000	9.355

Mean: *9.355/11 = 0.850* Aggregate Mean Ratio: *2,512,000/3,048,000 = 0.824*

Array ratios:

Array Ratios	Absolute Deviation from Median Ratio
0.669	.156
0.693	.132
0.697	.128
0.736	.089
0.765	.060
0.825	.000
0.961	.136
0.961	.136
0.984	.159
1.005	.180
1.059	.234
Total	1.410

Median: *0.825*

Range: *1.059-0.669 = 0.390*

Average Absolute Deviation from the Median – AAD: *1.410/11 = 0.128*

COD: *0.128/0.825 X 100 = 15.515*

PRD: *0.850/0.824 X 100 = 103.15*

What determinations can you make about the assessment's quality and uniformity?

The COD over 15.00 indicates that the assessment is not uniform. There is a large range between the highest and lowest ratios, which further illustrates that there is a great deal of dispersion and the quality of the assessment is questionable.

The PRD indicates that the assessment is Regressive. The high-valued properties are under assessed compared to low-valued properties.

The median ratio of 82.5 indicates a low level of assessment and is not in compliance with State standards

STATISTICS – SOLUTION

SALES STUDY PROBLEM #2

Round to three decimals in all calculations – 1.111 or 0.999

Calculate the individual sales ratios:

Sale No.	Address	Sale Date	Sale Price	Assessor's 2015 EMV	Sales Ratio
1	128 13th St.	Dec-13	$175,000	$157,500	0.900
2	564 18th St.	Feb-14	$164,000	$142,700	0.870
3	223 15th St.	May-14	$154,000	$126,300	0.820
4	103 View Ln.	Oct-13	$193,000	$154,400	0.800
5	400 11th St.	Apr-14	$187,000	$166,400	0.890
6	348 16th St.	May-14	$171,000	$131,700	0.770
7	222 Look Ln.	Aug-14	$198,000	$182,200	0.920
8	551 17th St.	Mar-14	$159,000	$144,700	0.910
9	454 15th St.	Jan-14	$177,000	$146,900	0.830
10	367 12th St.	Nov-13	$149,000	$140,100	0.940
		Totals	$1,727,000	$1,492,900	8.650

Mean: *8.650/10 = 0.865* Aggregate Mean Ratio: *1,492,900/1,727,000 = 0.864*

Array ratios:

Array Ratios	Absolute Deviation from Median Ratio
0.770	0.110
0.800	0.080
0.820	0.060
0.830	0.050
0.870	0.010
0.890	0.010
0.900	0.020
0.910	0.030
0.920	0.040
0.940	0.060
Total	0.470

Median: *0.870+0.890=1.760/2 = 0.880*

Range: *0.940 - 0.770 = 0.170*

Average Absolute Deviation from the Median – AAD: *0.470/10 = 0.047*

COD: *0.047/0.880 X100 = 5.341*

PRD: *0.865/0.864 = 100.1*

What determinations can you make about the assessment's quality and uniformity?

A COD of 5.341 indicates the assessment has excellent uniformity. The range of 0.170 between the highest and lowest ratios indicates a good level of uniformity: the ratios are not widely dispersed.

The PRD at 100.1 indicates that the assessment is unbiased. The high-valued properties and the low-valued properties have the same level of assessment. Overall this assessment is excellent.

The median ratio of 88.0 indicates a low level of assessment and is not in compliance with State standards